

Environmental Health **Snapshot**

Boulder County
2015-16



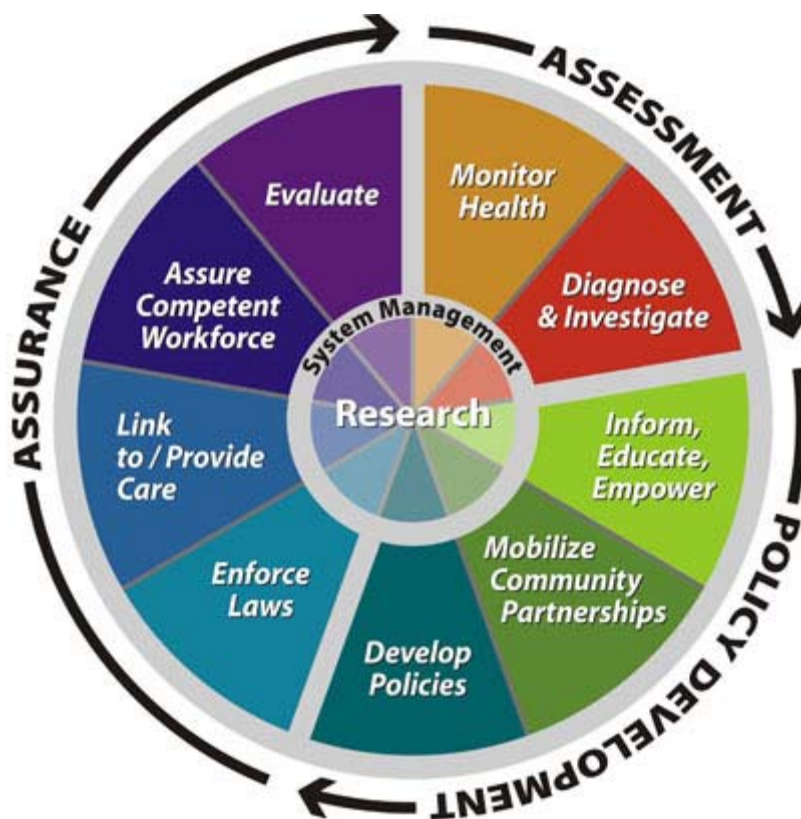
Environmental Health Snapshot

Humans interact with the environment constantly. These interactions affect quality of life, years of healthy life lived, and health disparities. According to the World Health Organization (WHO), “Environmental health addresses all the physical, chemical, and biological factors external to a person, and all the related factors impacting behaviors.”

Maintaining a healthy environment is central to increasing quality of life and years of healthy life. Globally, nearly 25% of all deaths and the total disease burden can be attributed to environmental factors. Environmental factors are diverse and far-reaching, including exposure to hazardous substances in the air, water, soil, and food; natural and technological disasters; physical hazards; nutritional deficiencies; and the built environment (Office of Disease Prevention and Promotion).

Poor environmental quality has its greatest impact on people whose health status is already at risk. Therefore, environmental health must address the societal and environmental factors that increase the likelihood of exposure and disease.

In 2015-16, Boulder County Public Health (BCPH) conducted an environmental health assessment to examine the environmental issues affecting Boulder County residents. The following pages present the findings of that assessment, which provides a snapshot of the status of health related to environmental issues in Boulder County. This snapshot will be used to strategically focus on areas of need and highest potential impact.



Water Quality

The safety of drinking water, groundwater, and recreational waters is impacted by water sources up and downstream of Boulder County. Ensuring a healthy drinking water supply is a core public health service and is vital to successfully encouraging residents to choose healthy beverages, a Boulder County focus area for improved health.

While the symptoms of many waterborne diseases are often short-lived, these diseases are preventable, and some exposures may have long-term health effects. Waterborne contaminants, such as *Escherichia coli* (*E. coli*), *Cryptosporidium*, *Giardia*, and *Shigella*; and acids and metals, like lead, copper, and uranium, can cause serious illness. Possible health effects include gastrointestinal illness, such as nausea, vomiting, and diarrhea; cancer from radiation, metals, and solvents; chronic conditions, such as kidney disease, cardiovascular effects, and neurologic or developmental disorders; acute conditions, including “blue baby syndrome” (methemoglobinemia), skin rash, or lung irritation; and life-threatening illnesses, such as Legionnaires’ Disease.¹

The impact of waterborne disease can be costly. The Centers for Disease Control and Prevention (CDC) estimates that every year at least 2,000 people in the United States are hospitalized, and about 60 die as a direct result of *E. coli* infection and its complications. One study estimated the annual cost of *E. coli* O157:H7 illnesses to be \$405 million (in 2003 dollars) due to premature deaths, medical care, and lost productivity.²

Climate change is already impacting groundwater and surface water resources and is likely to impact water quality more significantly in the future. Earlier spring runoff in mountainous river basins has already been measured, and it is projected that storms, flooding, and wildfires will become more intense and frequent. The 2013 flood in Boulder County caused significant impacts to water quality from raw sewage, hazardous waste, and debris.

Water Quality in Boulder County

In Boulder County, both groundwater and surface water are sources of drinking water. Although 95% of Boulder County residents get their drinking water from municipal drinking water facilities, residents in rural portions of the county are more likely to get their water from an individual well or community water system.³ In addition, there are 64 public and semi-public swimming pools and spas, and 1 natural swimming area in the county. Finally, there are many lakes and streams susceptible to stormwater contamination. Contaminants carried by stormwater to lakes and streams are a top source of pollution in U.S. lakes and rivers; they degrade ecosystems and impact human health.

Swimming Areas

BCPH monitors natural swimming areas according to the Colorado regulations, including testing for *E. coli* as an indication of the presence of harmful, disease-causing organisms or fecal matter contamination during active recreational periods.⁴ In 2016, concentrations exceeded the maximum contaminant level at the Boulder Reservoir.

BCPH does not have a pool inspection program; however, its Water Quality Program responds to approximately four pool emergencies each year. In 2016, 22 people were reported ill due to very high chlorine levels at a City of Lafayette public swimming pool. When responding to these emergencies, BCPH found that half of the pools in question violated critical inspection criteria.

Healthy People 2020 Objectives

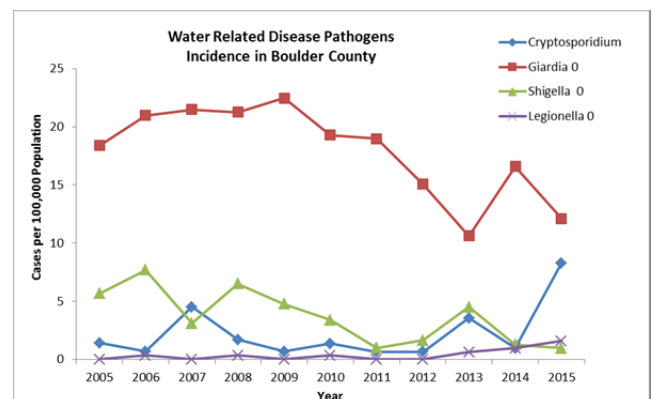
EH-4 – Increase the proportion of persons served by community water systems who receive a supply of drinking water that meets the regulations of the Safe Drinking Water Act.

EH-5 – Reduce waterborne disease outbreaks arising from water intended for drinking among persons served by community water systems.

EH-7 – Increase the proportion of days that beaches are open and safe for swimming.

EH-16.8 – Increase the proportion of the Nation’s elementary, middle, and high schools with community water systems that promote a healthy and safe physical school environment by inspecting drinking water outlets for bacteria.

EH-16.9 – Increase the proportion of the Nation’s elementary, middle, and high schools with community water systems that promote a healthy and safe physical school environment by inspecting drinking water outlets for coliforms.



Unfortunately, while surface water monitoring occurs in and near Boulder County cities, there is no public monitoring in the mountain areas. *E. coli* sources, both human and nonhuman, as well as secondary sources (such as biofilms) are a challenge to identify and control.

Drinking Water

In the city of Boulder in 2015, several metals, acids, and other water quality indicators (i.e. barium, chlorine, fluoride, sodium, total coliform, turbidity, copper, lead, haloaretic acids, and total trihalomethanes) were detected during required ongoing water testing. Fortunately, none were in violation of state and federal regulations. As infrastructure continues to age, however, other concerns, such as deteriorating pipes, may become a health concern. There is no required testing of private well water, which may contain some natural impurities or contaminants, even with no human activity or pollution. Testing of homes in Coal Creek Canyon in 2016 indicated uranium levels above the U.S. Environmental Protection Agency (EPA) limit, increasing the risk for cancer and kidney toxicity.⁵

Wastewater

Onsite wastewater treatment systems (OWTS), or septic systems, are the second most cited source of groundwater contamination in Boulder County because little – if anything – is known about how older and undocumented systems were designed or installed. The 2013 Colorado flood damaged many existing systems and impacted private and community water and sewer services. Unapproved, unpermitted, and damaged systems can introduce untreated human waste into groundwater, drinking water, and wells. This untreated wastewater can spread bacteria, viruses, parasites, fungi, and potentially many other disease-causing organisms that have yet to be identified.⁶

Stormwater

Stormwater runoff poses a serious threat to water quality and is a top source of pollution in U.S. lakes and rivers. Contaminants carried by stormwater to lakes and streams degrade the quality of human health and the ecosystems. In Boulder County and around the world, *E. coli* from stormwater runoff impacts stream segments. Other pollutants include sediment, nutrients, and pollutants from urbanized areas. Natural swim areas or stream segments where recreation occurs can be impacted by these pollutants and subsequently negatively affect human health. The Boulder County stormwater permit issued by the Colorado Department of Public Health and Environment (CDPHE) requires BCPH to prevent pollution from entering waterways in Boulder County.

Disparities

Undocumented, aging septic systems located in dense clusters are considered to be high risk due to higher rates of groundwater and surface water contamination – 36% in one study.⁷ Frequently, communities at high risk for water contamination are also home to residents with lower incomes.

In 2016, water quality concerns were identified at several mobile home parks that are home to many residents with low incomes. An initial survey of 30 residents living in 7 mobile home parks in the county revealed that 23% viewed their water quality as poor, and 60% stated they do not drink their tap water due to bad odor, taste, chlorine smell, unclear appearance, or fear of fluoride. Mapping of water discharges identified areas in the cities of Boulder, Longmont, and Lafayette where major dischargers are in close proximity to areas where low-income and minority populations live.

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Hazardous Waste and Toxic Substances

Toxic and hazardous substances or waste, such as cleaning solvents, spent acids and bases, metal finishing wastes, painting wastes, sludge, and electronic waste, can contribute to a wide variety of negative health outcomes – from cancer to disruption of organ systems and their development.^{1,2} Many of these substances have been classified through animal, human, or in vitro studies as known or suspected human carcinogens with negative impacts on human organ systems, such as the skin; heart and blood vessels; liver; kidney; respiratory, reproductive, and other organ systems.¹ In addition, household chemical and pesticide exposure may result in poisoning, the second leading cause of unintentional death due to injury in the United States.³

Unfortunately, “there is very limited information on the fate and transport of emerging contaminants (ECs), such as antibiotics, pesticides, pharmaceuticals, personal care products, etc. or combinations of chemicals in the environment and their toxicological impact.”⁴

Healthy People 2020 Objectives	
Toxics and Waste	Healthy Homes and Communities
EH-9 – Minimize the risks to human health and the environment posed by hazardous sites.	EH-16 – Increase the proportion of the Nation’s elementary, middle, and high schools that have official school policies and engage in practices that promote a healthy and safe physical school environment.
EH-10 – Reduce pesticide exposures that result in visits to a health care facility.	
EH-11 – Reduce the amount of toxic pollutants released into the environment.	
Infrastructure and Surveillance	
EH-20 – Reduce exposure to selected environmental chemicals in the population, as measured by blood and urine concentrations of the substances or their metabolites.	
EH-22 – Increase the number of States, Territories, Tribes, and the District of Columbia that monitor diseases or conditions that can be caused by exposure to environmental hazards.	

Hazardous Waste in Boulder County

Hazardous materials are transported through and around Boulder County every day by way of truck, car, rail, and airplane, making the county vulnerable to unintended emergency releases. Additional concerns in Boulder County include abandoned and non-operational sites, pesticides, poisoning, and improper disposal of hazardous waste. Additional abandoned sites, including historic mine sites, continue to be discovered within the county.

While the Boulder County Resource Conservation Division’s (RCD) Hazardous Materials Management Facility (HMMF) collects, recycles, reuses, and properly disposes of hazardous waste for residential households, businesses, and public facilities (e.g. schools), illegal disposal of hazardous materials continues to be an issue. Abandoned, unregulated, and unpermitted solid waste landfills exist throughout the county and can contain industrial, hazardous/toxic, pesticide, and biological waste.

The Boulder County Public Health Environmental Emergency Response Team (EERT) helps to minimize the impacts of spills and other releases on the environment and human health. In 2015, EERT responded to 13 incidents in Boulder County, which is slightly below the average 15 incidents per year since 2010.

Cleanup Sites

As of December 2015, there were 58 approved and 7 pending voluntary cleanup sites (e.g. contaminated properties needing redevelopment and transfer) in Boulder County.⁵ In addition, there is one active and one closed Superfund site in the county.⁶ Cleanup of the open Superfund site, Captain Jack Mill in the Left Hand Creek Watershed, began in 2003 to address impacts to the creek from acid mine drainage and heavy metals from mine waste piles. The earliest cleanup activities are expected to be completed is 2020.⁶ The Left Hand Water District, a regional water utility company in Colorado, provides drinking water to about 15,000 people and is located approximately 15 miles downstream of the Captain Jack Mill site.

Mines

Activities related to historic mine and ore milling sites (including uranium and radium) and coal and gravel mining have contaminated areas of Boulder County. Mine contaminants can include heavy metals, naturally occurring radioactive materials, and hazardous/toxic wastes. Impacts include water pollution and possible human/animal exposure via inhalation and ingestion. Data from a number of sources, such as the Colorado Abandoned Mined Lands Program, U.S. Geological Survey, U.S. Forest Service, and Boulder County Parks and Open Space, attempt to quantify the number of

sites and their impacts, but there is no regular oversight or updating of this information and assessment of stream health, location of the sources of pollution, metal source characterization, and aquatic and biological assessments need to be conducted to fully understand the impacts.

Other State and Federally Regulated Waste

The most recent data from 2014 indicate that 248,445 pounds of waste were disposed of on- or off-site, or were released (typically into the air) by facilities in Boulder County.⁷ Three-quarters of this waste was generated by the Valmont Station Power Plant (currently being decommissioned and expected to be offline by the end of 2017) and was primarily disposed of in an on-site landfill, reducing or eliminating the release of toxic chemicals to the environment. Decommissioning of this plant is expected to reduce nitrogen oxides by 5.64 tons per day (tpd), carbon monoxide by 0.32 tpd, and volatile organic compounds by 0.04 tpd.⁸

Toxic Substances in Boulder County

Household Cleaners

Household cleaning substances rank third out of the top five most common poison categories for human exposure.³ While the rate of poisoning decreased in Colorado and Boulder County between 2012 and 2014, there were 741 cases per 100,000 population of poisoning reported in Boulder County in 2014.

Pesticides

Pesticides can persist in the environment, and exposure can cause detrimental health impacts. In Boulder County and throughout the state there are growing concerns about pesticide use related to cannabis grow facilities. Additional research is needed to determine the health impacts this might have on workers and residents living near those facilities.

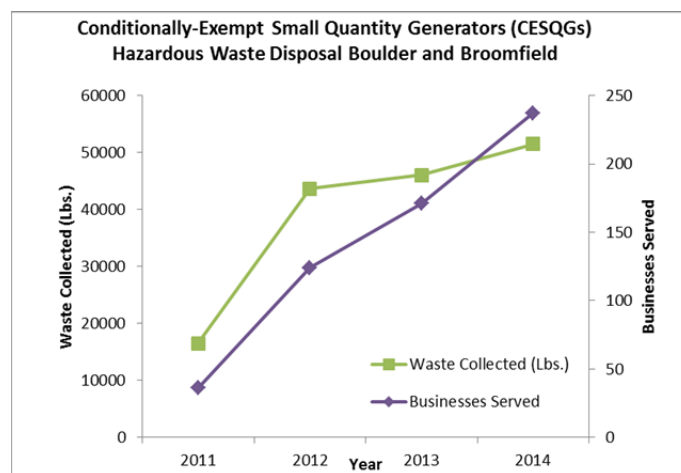
Pharmaceuticals

Unused pharmaceuticals, especially opioids, pose a growing concern in the United States. According to the CDC, “drug overdose is the leading cause of accidental death in the U.S., with 47,055 lethal drug overdoses in 2014. Opioid addiction is driving this epidemic, with 18,893 overdose deaths related to prescription pain relievers in 2014.”⁹ The U.S. Drug Enforcement Administration (DEA) introduced regulations in 2014 allowing police departments to collect and dispose of unused pharmaceuticals. Currently, these locations appear to be at full capacity, leaving an unknown number of Boulder County residents with unused prescription pharmaceuticals in their homes.

Small Business Waste

The Boulder County Resource Conservation Division operates a hazardous materials management facility (HMMF) for Boulder and Broomfield Counties, which collects small business and residential hazardous waste. Since 2011, the number of conditionally exempt small-quantity generators (CESQGs) served has increased to 237 CESQGs businesses using the facility in 2014.¹⁰ Unfortunately, there is no clear way to know how many CESQGs are not using this facility and improperly disposing of waste. Table 2 presents the most common business waste streams collected by the HMMF.¹⁰

Common Business Waste	
Waste Stream	% of Total
Fluorescent Tubes	46%
Mercury Bulbs (HID, Sodium)	2%
Oil Based Paints and Stains	7%
Latex Paint	33%
Shattershield Bulbs	0.2%
Flammable Liquids	6%
Aerosols	2%
Halogenated Solvents	1%
Non-PCB Ballasts	2%
Pesticides/Toxics	1%



Residential Hazardous Waste

The amount of household waste being managed increased since 2011 from 408 tons to 723 tons by 2014.¹⁰ While utilization of the HHMF and events has increased, only 12% of households are using the services.¹⁰ The largest sources of residential hazardous waste are paint, motor oil/antifreeze (from do-it-yourself oil changes), and household cleaners.

Disparities

Mapping areas for the potential for the accidental release of chemicals or volatile substances; contamination of groundwater and drinking water contamination; and risk of fire or explosion showed that in some areas of Boulder, Longmont, and Lafayette, there are areas where low-income and minority populations are living near treatment, storage, and disposal facilities.

Other potentially vulnerable populations include the very young, old, or immunocompromised individuals. Colorado data show that children under five years are at a disproportional risk for poisoning from household substances. Data regarding hospitalizations or emergency room visits as a result of these incidents are not currently tracked; thus, little is known about acute health issues related to toxic substances and hazardous waste exposures.

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Utilization of Hazardous Materials Management Facility (HHMF) in Boulder and Broomfield Counties			
Year	Households Served excluding Events	Events	Households Served (Including Events)
2011	9,613	1,157	10,770
2012	12,528	873	13,401
2013	15,255	1,167	16,422
2014	15,778	942	16,720

Nutrition, Physical Activity, and the Built Environment

Dietary risks are the leading factor in years of healthy life lost in the United States. Among these risk factors, high body mass index (BMI), high blood pressure, high fasting plasma glucose, physical inactivity, and low physical activity are ranked third through sixth.¹ Healthy eating and active living positively impact and reduce these risk factors and are influenced by the environment where a person lives.

Nutrition

Sugary drinks, including soda, sweetened fruit drinks, sweetened coffees and teas, and other drinks with added sugars, are the greatest source of added sugar in the American diet.² Drinking just 1 or 2 sodas per day increases risk for type 2 diabetes by 26%.³ According to the CDC, 1 in 3 children born in the United States in the year 2000 will develop type 2 diabetes at some point in their lives. For children of color, 1 in 2 will develop the disease.⁴ Kids who consume 1 or more sweetened beverages a day are 55% more likely to become overweight or obese than children who drink very few sugary drinks.⁵ In addition, fruit and vegetable consumption decreases cardiovascular disease risk, risk of some cancers, aids in digestion, aids in healthy weight management, and may even boost school performance among children.^{6,7}

Physical Activity and Built Environment

One way to increase physical activity is to increase the number of people who commute to school or work via public transportation, bike or walking, termed “active transportation.” U.S. evidence shows that in areas where people had safe places to walk within 10 minutes of their homes, 43% of residents met recommended physical activity levels, while just 27% of residents without safe places to walk met the recommended activity levels.⁸

Healthy People 2020 Objectives	
Healthier Food Access	Physical Activity
NWS-4* – Increase the proportion of Americans who have access to a food retail outlet that sells a variety of foods that are encouraged by the Dietary Guidelines for Americans.	PA-10 – Increase the proportion of the Nation’s public and private schools that provide access to their physical activity spaces and facilities for all persons outside of normal school hours.
NWS-7* – Increase the proportion of worksites that offer nutrition or weight management classes or counseling.	PA-12* – Increase the proportion of employed adults who have access to and participate in employer-based exercise facilities and exercise programs.
Food Insecurity	Transportation
NWS-12 – Eliminate very low food security among children.	PA-13* – Increase the proportion of trips made by walking.
NWS-13 – Reduce household food insecurity, and in doing so, reduce hunger.	PA-14* – Increase the proportion of trips made by bicycling.
Built Environment	
PA-15* – Increase legislative policies for the built environment that enhance access to and availability of physical activity opportunities.	
EH-23 – Reduce the number of public schools located within 150 meters of major highways in the United States.	

*Objective is developmental

Nutrition, Physical Activity, and Built Environment in Boulder County

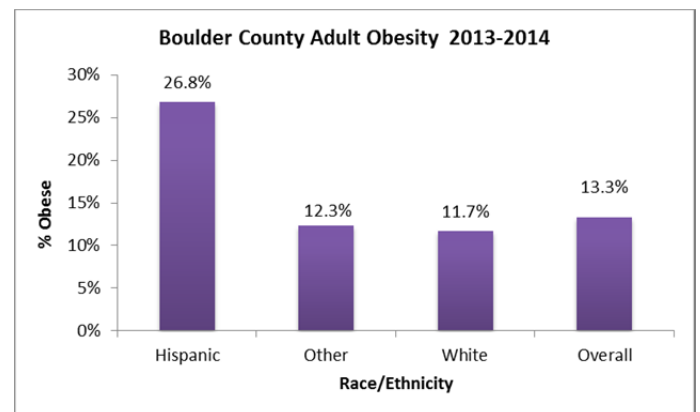
In Boulder County in 2014 the leading causes of death were cancer and cardiovascular disease.⁹ While Boulder County is one of the leanest counties in the state, 45% of Boulder County adults are overweight or obese, and 24% of Boulder County children age 2-14 are overweight or obese.^{10,11}

Nutrition

The recommended minimum daily consumption of fruits and vegetables is five servings per day. Results of the Child Health Survey (CHS) from 2011-2013 indicate that children in Boulder County are not consuming as many fruits and vegetables daily as in the rest of the state (see Table 2).¹² While it is recommended that children consume no sugary drinks, 14% of children in Boulder County aged 1-14 (see Table 2) consume 1 or more sugary drinks every day.¹²

Physical Activity

Physical activity is another useful measure of a healthy community and can be helped or hindered by available recreational areas, safe sidewalks, availability and safety of bike lanes, and other aspects of the physical environment. The 2008 National Physical Activity Guidelines for the U.S. recommend that children aged 6-18 years need at least 60



minutes of moderate or vigorous physical activity every day. In Boulder County, only 52% of children (aged 5-14 years) were physically active for at least 60 minutes/day for the past 7 days, though in Colorado as a whole, only 45% of children were physically active this frequently.¹² BCPH aimed to increase the percentage of active children to 54.5% by December 2016. Among surveyed Boulder County high school students (grades 9-12), 77% participated in vigorous physical activity for at least 60 minutes on 3 or more of the 7 days preceding.¹³

Built Environment

While 51% of Boulder County high schoolers said they could walk, ride a bike or scooter, or skateboard to school, only 17% of students did so 1 or more days in an average week.¹³ Additionally, only 15% of workers 16 years or older commute to work via public transportation, walking, or bicycling.¹⁴

Disparities

Among adults in Boulder County, Hispanic populations are experiencing the highest rates of obesity.¹⁰ Hispanic and black children in Colorado are 1.8 to 2 times more less likely than non-Hispanic children to consume vegetables on a daily basis. Similarly, children from low-income households (i.e. less than \$25,000 per year) compared to children from households earning \$50,000 or more are 1.8 times less likely to eat vegetables at least once per day.¹²

Additionally, 12% of preschoolers in low-income families are considered to be obese.¹⁵ In these low-income Colorado households, 30% of children drink 1 or more sugary drinks per day. Hispanic and black children aged 1-14 years are almost twice as likely (30% and 29%, respectively) as non-Hispanic white children (15%) to consume 1 or more sugary drinks per day.¹⁶

Physical activity rates also differ among county population groups; Hispanic high school students were less likely than their non-Hispanic white classmates to exercise vigorously three or more times a week, and they're more likely to watch TV or play video/computer games for three or more hours a night on an average school day.¹³ Together, these factors put low-income and minority children at increased risk of obesity, diabetes, and associated health problems.

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Indoor Air Quality

Most Americans spend up to 90% of their time indoors, and many spend most of their working hours in an office environment. Pollutants in the indoor environment can increase the risk of illness, including rhinitis (runny nose), sinusitis, vocal cord dysfunction, more respiratory infections in general, asthma, hypersensitivity pneumonitis, organic dust toxic syndrome, infectious disease (such as Legionella), dermatitis, and lung cancer.¹

Common indoor pollutants include microbial agents with their attendant antigenic properties, volatile organic compounds (VOCs), second and third-hand smoke, fibers (e.g. asbestos), radon, and fossil fuel combustion byproducts (e.g. carbon monoxide [CO]). Sources of these pollutants include building materials, moisture, office and cleaning supplies, legacy exposure like lead-based paint, and vehicular exhaust near homes.

Radon

The National Academy of Sciences (NAS), American Lung Association, Environmental Protection Agency (EPA), and American Heart Association have determined that radon is the second leading cause of lung cancer in the country. No level of exposure to radon is considered safe. Every year in the U.S., about 21,000 people die from radon-related lung cancer; 500 of these deaths are among Coloradans.² Risk of lung cancer from radon is almost 25 times higher for smokers compared to those who have never smoked.³

Mold

Mold's primary health effect is as an allergen causing irritation of the eyes, nose, and upper respiratory system. Household molds have also been linked to development of childhood asthma; asthma is one of the most common chronic disorders in childhood.⁴ The impacts can be even more dangerous for people with compromised immune systems or chronic respiratory diseases like asthma. Respiratory infections and the common cold often are more common and last longer for children and adults who live in water-damaged dwellings where mold and bacteria grow.

Lead

Even very small amounts of lead can be extremely dangerous to young children who are at greater risk of lead poisoning since they touch their hands to their mouth often; their digestive tracts absorb more lead proportionally; and their brains are still developing. Lead has been associated with delayed development, brain and nervous system damage, reading and learning difficulties, lowered IQ, hyperactivity, and discipline problems.⁵

Carbon Monoxide

Carbon Monoxide (CO) is an odorless, colorless gas that kills without warning. Each year in the U.S., unintentional CO poisoning causes 400 deaths (unrelated to fires); more than 20,000 emergency room visits; and more than 4,000

Healthy People 2020 Objectives	
EH-8 – Reduce blood lead levels in children.	EH-17* – Increase the proportion of persons living in pre-1978 housing that has been tested for the presence of lead-based paint or related hazards.
EH-13 – Reduce indoor allergen levels (cockroach, mouse).	
EH-14 – Increase the proportion of homes with an operating radon mitigation system for persons living in homes at risk for radon exposure.	EH-18 – Reduce the number of U.S. homes that are found to have lead-based paint or related hazards.
EH-15 – Increase the proportion of new single-family homes (SFH) constructed with radon-reducing features, especially in high-radon-potential areas.	EH-19 – Reduce the proportion of occupied housing units that have moderate or severe physical problems.
EH-16 – Increase the proportion of the Nation's elementary, middle, and high schools that have official school policies and engage in practices that promote a healthy and safe physical school environment (including: indoor air quality management, mold issues).	EH-20.3 – Reduce exposure to lead in the population, as measured by blood and urine concentrations of the substance or its metabolites.
EH-22 – Increase the number of States, Territories, Tribes, and the District of Columbia that monitor diseases or conditions that can be caused by exposure to environmental hazards (including: lead poisoning, carbon monoxide poisoning).	
Tobacco Use	
TU-11 – Reduce the proportion of nonsmokers exposed to secondhand smoke.	
TU-12 – Increase the proportion of persons covered by indoor worksite policies that prohibit smoking.	
TU-13 – Establish laws in States, District of Columbia, Territories, and Tribes on smoke-free indoor air that prohibit smoking in public places and worksites.	
TU-14 – Increase the proportion of smoke-free homes.	
TU-15 – Increase tobacco-free environments in schools, including all school facilities, property, vehicles, and school events.	

*Objective is developmental

hospitalizations.⁶ Many household items including gas- and oil-burning furnaces, portable generators, and charcoal grills produce this poison gas.

Asbestos

Older homes and schools were often constructed with building materials that contained asbestos, a fire retardant. And still, it is common to find asbestos in homes built after the year 2000. Breathing asbestos dust can cause lung cancer and asbestosis. In general, asbestos is not a health risk unless it is disturbed; however, the general lack of knowledge of how common asbestos-containing building materials are (asbestos is very common in drywall skim coats and plastic floor tile in Colorado) and the very common extent of renovation done in homes that disturbs asbestos-containing building materials means that asbestos exposures are very common in the county.

Volatile Organic Compounds (VOCs)

Many other chemicals in buildings can contribute to health issues. New buildings are tightly sealed to save energy, but they contain building materials like paints, adhesives, cleaners, plastics, fabric protectors, office products, and equipment that contain volatile organic compounds (VOCs). These materials off-gas and can lead to irritation; asthma symptoms; dermatitis; and less specific illnesses, such as “sick building syndrome.” Formaldehyde is a major contributor and can cause cancer; it can also be found in glues and binders.

Indoor Air Quality in Boulder County

The most common indoor air quality (IAQ) complaint in Boulder County is a moldy building condition. Other common indoor environment issues reported are asbestos, carbon monoxide, radon, methamphetamine contamination, secondhand smoke, and lead exposure. BCPH receives hundreds of calls each year from residents struggling to address these exposures in their homes and avoid the associated negative health impacts.

Radon

Between 2011 and 2014, the average indoor radon concentration measured in Boulder County was 5.7 picocuries per liter (pCi/L); test results for 1 out of every 2 homes were at or above EPA’s radon action level of 4 pCi/L (compared to only 6% of homes across the rest of the U.S.).²

Mold

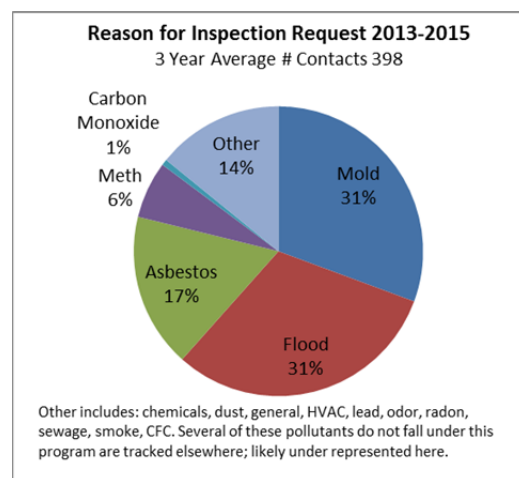
The catastrophic floods of September 2013 increased mold exposure among Boulder County residents. Between 2004 and 2014, an average of 51 people per 100,000 were hospitalized due to asthma compared to 85 per 100,000 for the state during the same time period.⁷ Of adults in Boulder County, 14.6% have been told by their doctor that they have asthma.⁸ Between 2012 and 2014, asthma affected 5.2% of children age 2-14 in Boulder County.⁹

Lead

Homes built before 1978 are likely to contain lead-based paint. In Boulder County, 42% of the population (based on 2008-2012 estimates) lives in census blocks where the median year housing units were built was before 1978.¹⁰ A study of a cohort of children born in Boulder County in 2008, followed to the age of 3 years old, indicates that only 9% of children are being tested for elevated blood lead levels. Of those tested, 1% had confirmed elevated blood lead levels.¹¹

Volatile Organic Compounds (VOCs)

Tobacco smoke contains over 4,000 toxicants which contributes to poor indoor air quality and can lead to declined airflow, bronchitis, childhood pneumonia and bronchitis, asthma exacerbation, eye irritation, cardiovascular disease, stroke, and cancer. While Boulder County is below the Healthy People 2020 (HP2020) target of 12% of the population smoking, there are still 10.9% of adults in Boulder County that smoke, contributing to poor indoor air quality.⁸



Carbon Monoxide

BCPH typically responds to about three calls each year about carbon monoxide poisoning.

Methamphetamines

In recent years there has been a dramatic increase in the abuse of recreational drugs, such as methamphetamines. In Colorado, identification of methamphetamine labs increased from 31 in 1998 to 454 in 2002; 13 were in Boulder County. Due to testing requirements aimed at protecting children, methamphetamine-affected properties have become easier to identify. In 2013, three meth-affected properties were identified; in 2015, 35 were identified; and in 2016, 40 were identified.

Disparities

One environmental indicator of indoor air quality is the lead paint indicator – the percentage of occupied housing units built before 1960. Although lead-based paint was banned in the United States in 1978, many houses still have lead hazards present. However, houses built before 1960 are 9 times more likely to have significant lead-based paint hazards.¹² Mapping of these data indicate that Boulder, Longmont, and Lafayette all have areas where low-income and minority populations are living in homes built prior to 1960. In addition, many low-income and minority populations don't own their homes, or they live in multi-family buildings and, hence, often do not have the choice or means to limit their radon exposure.

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Outdoor Air Quality

Under the Clean Air Act, the EPA establishes national air quality standards to protect public health, including the health of "sensitive" populations. The EPA also sets limits to protect public welfare, including protection against decreased visibility and crop damage. Since these standards are not always met around the country, some of the HP2020 objectives are aimed at reducing air pollution (see Table 1).

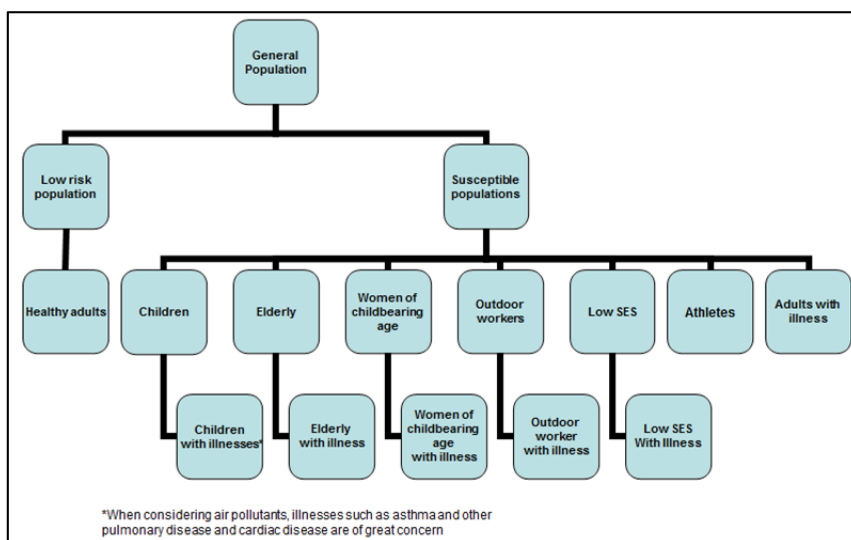
Healthy People 2020 Objectives

EH-1 – Reduce the number of days the Air Quality Index (AQI) exceeds 100, weighted by population and AQI.

EH-3 – Reduce air toxic emissions to decrease the risk of adverse health effects caused by mobile, area, and major sources of airborne toxics.

The six criteria pollutants regulated under the Clean Air Act, which have established National Ambient Air Quality Standards (NAAQS), are ozone (O₃), sulfur dioxide (SO₂), particulate matter (PM), nitrogen dioxide (NO₂), carbon monoxide (CO), and lead (Pb). These pollutants have been associated with decreased lung function, increased hospitalizations (both respiratory and cardiac), premature mortality, increased asthma exacerbations, increased blood pressure,¹ and increased risk for obesity and diabetes.²

The primary air pollutant of concern in Boulder County is ozone. While in the stratosphere, ozone is protective, but ground-level ozone in the tropospheric (the closest zone to Earth's surface) is quite hazardous and is formed by a combination of nitrogen oxides (sources include industry, cars/trucks, generators), VOC emissions (sources include oil and gas production, refineries, manufacturing, gas stations, lawn mowers, cars/trucks), and a photochemical reaction with sunlight. Ozone can aggravate asthma, chronic bronchitis, and emphysema; increase medication use; increase doctor and emergency room visits; and increase hospital admissions.³



Oil and gas production is the largest industrial source of VOC emissions,⁴ a group of chemicals that contribute to the formation of ground-level ozone and one of the largest sources of methane, a potent greenhouse gas (GHG). Production within Boulder County may result in localized exposure to air toxics, potential increases in exposure to ground-level ozone, and increases in methane emissions.

In addition, global climate change caused by the emissions of carbon dioxide and other GHGs represent one of the largest threats of our time. Consequences include loss of life and property from increased severe weather incidents and wildfires.

Outdoor Air Quality in Boulder County

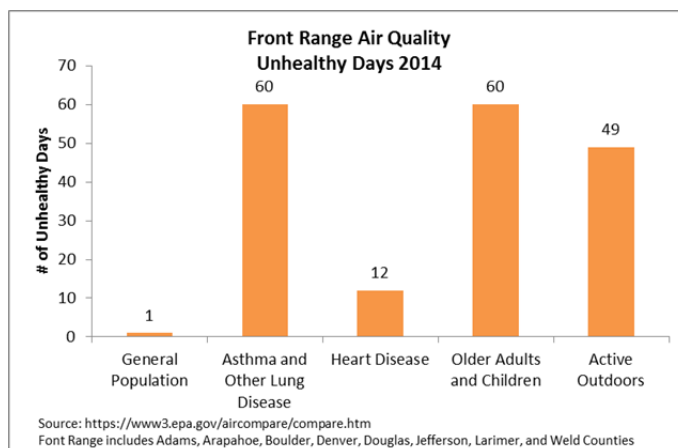
Outdoor air quality is a serious concern in Boulder County. In April 2016, the Denver-Boulder area was 1 of only 11 of the 36 marginal ozone nonattainment areas to fail to meet the standard to the degree that the area has now been designated as "moderate" nonattainment, indicating an increase in severity of the ozone problem in the area. Boulder County does not meet the EPA standard for ozone.⁵ Meeting the American Thoracic Society recommendations for ozone would result in 9 fewer deaths and 29,683 fewer adverse health events per year (adverse events include days where activity is restricted, as well as major health endpoints like heart attacks, hospital admissions, and emergency room visits).⁵

Sensitive populations in Boulder County include 34,358 children under the age of 10 (11.3% of the population);⁶ 33,793 residents 65 years of age and older (11.1% of the population);⁶ and asthmatics (14.6% of adults,⁷ 5.2% of children age 2-14).⁸ An average of 51 people per 100,000 were hospitalized due to asthma from 2004-2014.⁹

Additionally, outdoor workers, athletes, women of childbearing age, and people with low socio-economic status are at increased risk of experiencing negative health impacts due to poor outdoor air quality.¹⁰

Air Quality Index

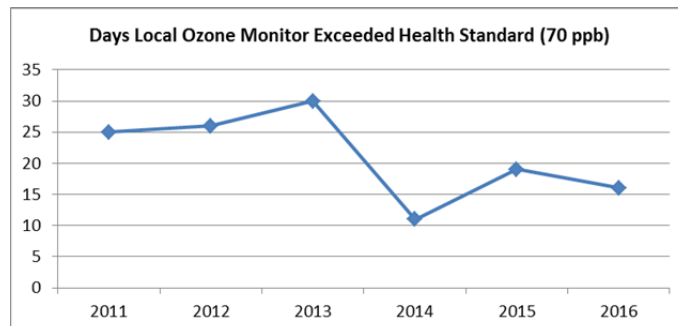
The most common indicator of outdoor air quality is the Air Quality Index (AQI), an index for reporting daily air quality that focuses on health effects that may be experienced within a few hours or days after breathing polluted air. AQI values below 100 are thought to be protective of human health; the higher the AQI value, the greater the level of air pollution and the greater the health concern.¹¹ AQI values in the Colorado Front Range area can vary from one season to another and are usually below 100, although the area experiences unhealthy days each year, and high-risk populations feel the burden.



Ozone

Boulder County is part of the nine-county North Front Range and Denver Metro area that does not meet the EPA health standard for ozone. This means that air quality is prone to being unhealthy, especially for sensitive populations.

In 2015, the EPA reduced the ozone standard from 75 parts per billion (ppb) to 70 ppb based on health data indicating that the former standard was not protective of the public. Boulder County area monitoring demonstrates consistent exceedances of the current health standard since 2010 and including 17 days in just half of the 2016 summer ozone season. Oil and gas development is now considered to represent the largest source of ozone-forming emissions, exceeding motor vehicles by almost double.



Nitrogen Oxides

In addition to its role as an ozone precursor, nitrogen oxides are a primary contributor to decreased visibility, damage crops, and acid rain in Rocky Mountain National Park. Under the EPA Regional Haze Rule, Colorado adopted a stringent plan to reduce nitrogen oxide emissions that will result in the shutdown of 17 coal-fired power plants in the state, including the Valmont Power Plant in Boulder County in 2017.

Particulate Matter

Particulate matter is another serious threat to public health in Boulder County. Fine particulates (PM_{2.5}) can cause cardiopulmonary and heart disease. In 2014, concentrations of PM_{2.5} were above the EPA standard (35 micrograms per cubic meter [$\mu\text{g}/\text{m}^3$]) on 1.6% of days in Boulder County, resulting in an average annual concentration of 7.5 $\mu\text{g}/\text{m}^3$.¹²

Disparities

Since outdoor air quality is very much regionalized, it is difficult to make firm conclusions on a census block group level about disparities. Mapping air toxics indicators; hazardous air pollutants known or suspected to cause cancer; diesel particulate matter (DPM); particulate matter; ozone; asthma hospitalization rates; and traffic proximity and volume indicated that areas of Longmont and Lafayette where low-income and minority populations live may have higher exposure to hazardous air pollutants, contributing to lifetime cancer risk. In addition, socio-economic status and access to/use of managing medications may be related to asthma hospitalization in these areas rather than proximity to different toxins/exposures. Traffic proximity does not appear related to asthma hospitalizations throughout the county.

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Environmental Diseases

Environmental diseases can have serious, sometimes deadly impacts on human and animal health. Zoonotic diseases common in Boulder County include bubonic plague, rabies, West Nile virus (WNV), and tularemia. The health impact of these diseases can include fever and body aches, lifelong neurological impairment, hospitalization, and even death.

Healthy People 2020 Objective

IID-21 – Increase the number of States that use electronic data from rabies animal surveillance to inform public health prevention programs.

Environmental Diseases in Boulder County

Boulder County has a large number of outdoor recreational areas and open spaces with abundant wildlife that can harbor vector-borne or zoonotic diseases which can lead to human disease. Since 2013, human cases of tularemia have increased, and there continues to be cases of rabies in animals and WNV in humans every year.

Despite surveillance and disease control measures, Boulder, Weld, and Larimer Counties continue to be the epicenter for WNV in Colorado; 2015 had the highest number of reported human tularemia cases ever recorded in the state. While no human cases of rabies have occurred since 1931 in Colorado, many animals carry rabies, and the number of species hosting the disease in Boulder County continues to expand.

Zoonotic Disease Cases in Colorado							
Report Year	2009	2010	2011	2012	2013	5-Year Average	2014
Plague	0	0	0	1	0	0.2	8
Rabies, Human	0	0	0	0	0	0	0
Rabies, Animal	103	136	104	183	187	142.6	129
Tularemia	2	3	3	0	2	2	16
West Nile Virus	104	79	7	134	321	129	118

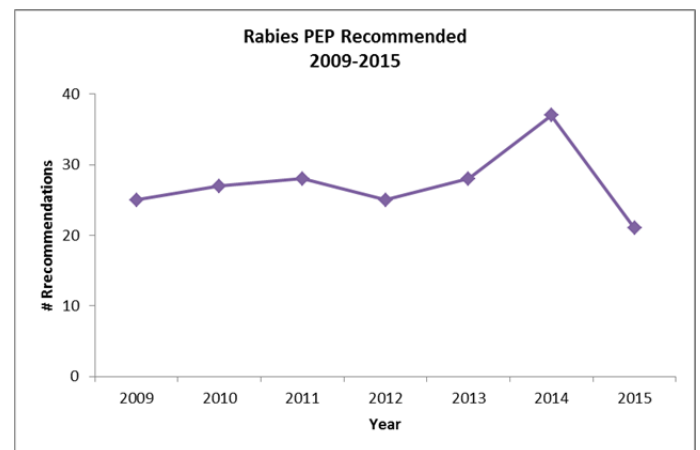
Adapted from 2014 Colorado Zoonoses Report, CDPHE

Plague

Prior to 2006, the last human case of plague in Colorado occurred in 1993. There were 4 human cases of plague in Colorado in 2006; 1 in 2012; 10 in 2014; and 4 in 2015 – 1 of which was in Boulder County.¹ Between 2005 and 2014, 14% of 3,042 wildlife samples submitted for testing in Colorado were positive for plague; 15% of 249 wildlife samples submitted from Boulder County were positive for plague.

Rabies

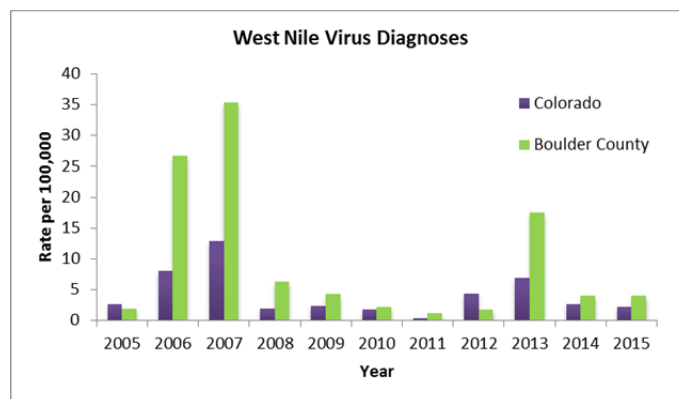
In 2015, Boulder County accounted for the largest percentage of total cases (21%) of rabies in animal populations across the state. Of the 25 confirmed animal cases in the county, 68% were skunks, and 28% were bats; Boulder County had the only confirmed raccoon case.² Since animal cases of rabies occur predominately in species that interact with domestic pets, pets are at risk of becoming new carriers, subsequently increasing risks to humans. Two confirmed cases of rabies in house cats emerged in 2015, one in El Paso County and one in Elbert County. Unfortunately, limited county data exist on pet vaccination rates. In 2015, BCPH sent 34 letters to residents requiring 45-day home observations, 1 letter to a resident that required 90-day quarantine, and 7 letters to residents requiring 180-day quarantines for pets that were not in compliance with vaccination requirements.



Also in 2015, 119 animal bites related to the spread of rabies were investigated. In 2014, post-exposure prophylaxis (PEP) recommendations were recommended to 37 people. Between 2012 and 2014 in Boulder County, the average cost for PEP treatment for humans following potential exposure to rabies was upwards of \$10,084 per person, a costly treatment intervention but critical to survival after infection.

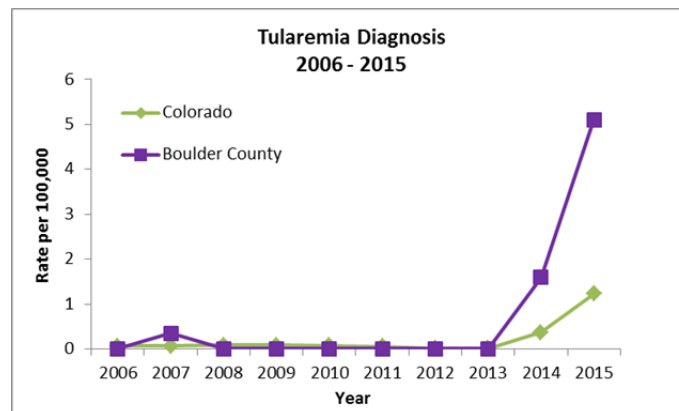
West Nile Virus (WNV)

West Nile fever is a mosquito-borne infection caused by the West Nile virus. About 1 in 5 people who are infected will develop a fever with other symptoms. Less than 1% of infected people develop a serious, sometimes fatal, neurologic illness. WNV was introduced in Colorado in 2002; by 2003 there were 3,043 cases (67 cases per 100,000 population), 15% of which occurred in Boulder County (157 cases per 100,000 population).³ Boulder County regularly has higher rates of WNV infections compared to the rest of Colorado.



Tularemia

In 2015, rabbits comprised 14 of 28 positive animal tests for tularemia in Colorado; 16 were in Boulder County, subsequently causing an increase in the rate of reported human cases from 0 in 2014 to 5 (16 total cases) cases per 100,000, almost 5 times the rate of tularemia for the entire state. In 2015, 28% of the suspect animals in Colorado (100) tested positive for Tularemia.⁴



Disparities

Individuals spending a significant amount of time outside, including homeless people and those with rodent problems in their homes, are at higher risk of contracting a zoonotic disease. WNV disproportionately impacts persons over the age of 50 – most deaths occurring in this age group⁵ – and people with medical conditions, such as cancer, diabetes, hypertension, kidney disease, and solid-organ transplants. In addition, Weld and Larimer Counties conduct little or no mosquito control in unincorporated (often irrigated) areas of their counties, which are in close proximity to Boulder County residents, subsequently increasing risk of disease for residents in those areas. Tularemia does not appear to impact a specific age group; however, 73% of Boulder County cases between 2007 and 2015 occurred in men.⁴

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Bloodborne Diseases

Boulder County is home to approximately 37 body art establishments, the majority of which are located near the University of Colorado (CU). This includes 29 facilities performing some type of body art (e.g. piercing, tattooing, or both) and 8 permanent makeup facilities. The primary public health concern related to body art is risk to clients and artists for acquiring bloodborne diseases, such as HIV and hepatitis, and infections from body art procedures, including community-associated methicillin-resistant *Staphylococcus aureus* (CA-MRSA). This risk is inherent in procedures involving needles, skin piercing, and inserting or implanting facial cosmetic pigment under the surface of the skin on the face.

High-risk populations include body artists, injection drug users, men who have sex with men, Asian and Pacific Islanders, African American Community, and persons with sexually transmitted infections (STIs) or HIV. Underage youth are at higher risk for receiving body art from unlicensed vendors who may use unsafe practices.

Bloodborne Diseases in Boulder County

Since 2005, 18% of the people who had acute hepatitis B (HBV) and hepatitis C (HCV) in Boulder County (28 cases) reported also having a tattoo or body piercing.¹

Hepatitis

Between 2005 and 2009, rates of hepatitis A (HAV) per 100,000 in Colorado among Hispanic, Asian/Pacific Islander (non-Hispanic), and white (non-Hispanic) populations were 1.1, 0.9, and 0.7, respectively. In Boulder County between 2005 and 2009, the average rate of hepatitis was 1.15 per 100,000 cases, putting Boulder County 15th among all counties in Colorado. In 2014, the Boulder County rate per 100,000 for hepatitis B (HBV) was 5.4; comparatively low within the state.¹

Hepatitis B Cases in Boulder County	
Year	Rate Per 100,000
2009	10
2010	8.1
2011	8.7
2012	5.6
2013	7.1
2014	5.4

Human Immunodeficiency Virus (HIV)

In Boulder County, the rate of newly reported HIV cases stabilized around 4 (3.7-4.3) per 100,000 between 2010 and 2013, but nearly doubled in 2009 to 7.5 cases per 100,000. Between 2010 and 2013 the rates in Boulder County were approximately half of the rates statewide.²

Methicillin-Resistant Staphylococcus Aureus (CA-MRSA)

While there are no data showing MRSA infections in the community, in the health care setting, infections are declining despite 2 in 100 people carrying MRSA in the community.³ Similarly, CDPHE does not provide data related to MRSA and body art and is not able to attribute MRSA infections to specific facilities due to limited reporting requirements.

Disparities

According to CDPHE in Colorado in 2014, “the majority of acute cases [of HBV] were reported among white non-Hispanics (n=16; 53.3%). The greatest number of chronic HBV infections were reported among Asian/Pacific Islanders (n=166; 30.6%).” In 2014, Boulder County was among the top ten counties with the greatest reported number of hepatitis C (HCV) cases, at 43 cases per 100,000 population. The greatest number of acute cases was among people aged 20-29 years, and the greatest number of reported chronic cases was among individuals who were 50-59.² Since 2012, the majority of HIV infections in Colorado have been among non-Hispanic white males.

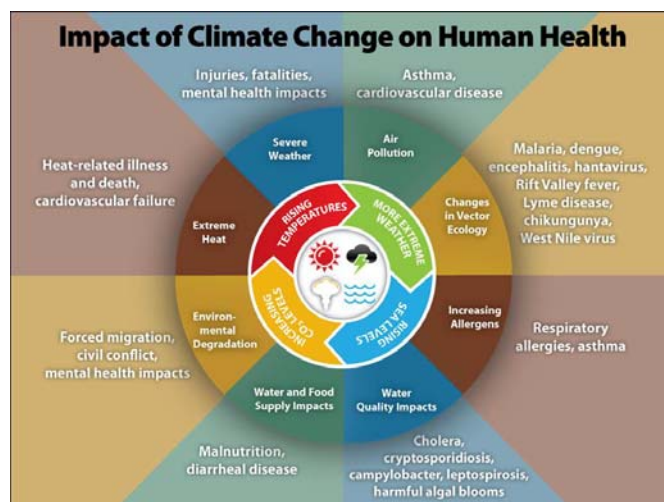
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Climate Change

As global temperatures continue to shift there are catastrophic implications for health. Impacts will likely include greater risk of injury, disease, and death due to more intense heat waves and fires; increased costs and disruption of fresh produce supply; consequences for health of lost work capacity and reduced labor productivity in vulnerable populations; increased risks of foodborne, waterborne, and vectorborne diseases; modest reductions in cold-related mortality and morbidity in some areas due to fewer cold extremes; geographical shifts in food production; and reduced capacity of disease-carrying vectors due to exceedance of thermal thresholds.¹

Efforts that reduce negative human impacts on climate change, an emerging area of concern in HP2020 objectives (see Table 1), are necessary to reduce the risk of catastrophic storms, drought, wildfires, and loss of alpine ecosystems.



Since climate change can be both positively and negatively impacted by humans, it is paramount that behaviors be modified to reduce greenhouse gas (GHG) emissions, increase sustainable practices, and prevent further acceleration of global warming. Several areas must be targeted to reduce the impacts of global warming on human health, including decreasing water and energy usage; using cleaner energy sources; increasing active or shared transportation; reducing waste by increasing reuse, recycling, and composting; preparing food systems; and fire, heat wave, and flood adaptation plans.

Environmental Health HP2020 Objectives

- | |
|---|
| EH-2 – Increase use of alternative modes of transportation for work (bicycling, walking, mass transit, telecommute). |
| EH-6 – Reduce per capita domestic water withdrawals with respect to use and conservation. |
| EH-12 – Increase recycling of municipal solid waste. |

Climate Change Emissions in Boulder County

Commercial Energy Use

Commercial and industrial energy use is responsible for more than half (51%) of all GHG emissions in Boulder County² – the equivalent of approximately 1.8 million metric tons of carbon dioxide (mtCO₂e); transportation and residential use contribute 24% and 15% respectively, and the remaining 10% can be attributed to activities like aviation and waste processing.

Transportation

Boulder County residents drive their cars 22% less often than others in the Central Front Range;³ unfortunately 65% of Boulder County residents still drive alone to work.⁴

Waste

Boulder County residents and businesses throw away an estimated 250,000 tons of “garbage” each year, which includes an estimated 5,200+ tons of paper and cardboard that could be used to make new products, an estimated 5,100 tons of building materials that could be used locally in new construction, and an estimated 25,000 tons of food and yard debris that create methane when buried in landfills.⁵ In Boulder County, roughly four pounds of waste per person per day is sent to the landfill, and more than one-third of the community’s total carbon emissions come from resource production and use.

Disparities

Negative global impacts are most severely felt by vulnerable populations, who will experience an increase in poor health outcomes. The very young and very old are at increased risk, and the social determinants of health, such as socioeconomic factors and health disparities, are related to and may amplify, moderate, or influence climate-related health effects.⁶

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Food Safety

In the United States, an estimated 48 million people experience a foodborne illness every year, causing 128,000 hospitalizations and an estimated 3,000 preventable deaths annually.¹

Foodborne illness is the top reason for visits to emergency rooms and is estimated to cost our health care system \$8-23 billion each year. In Colorado, 800,000 people become ill each year from preventable foodborne illnesses, costing an estimated \$500,000 and \$1.5 million annually. Colorado ranks eighth in the nation for the number of foodborne illness outbreaks.

Children under the age of 5 years, pregnant women, immunocompromised individuals, adults over the age of 65, and persons with food allergies are at higher risk for becoming ill, hospitalized, or dying from foodborne illness.

HP2020 national objectives have been set to reduce outbreak-associated infections related to specific foodborne illnesses.²

Foodborne Disease in Boulder County

There are approximately 1,690 food facilities in Boulder County, including restaurants, mobile carts, retail markets, caterers, schools, temporary food vendors, and institutions. BCPH generally investigates 4-11 foodborne outbreaks each year.

Despite monitoring, inspection, and training, incidence of foodborne illness in Boulder County continues to be higher than national objectives, particularly for *Campylobacter* and shiga toxin-producing *Escherichia coli* (STEC) O157.

Shiga toxin-producing *E. coli* (STEC) O157

Fortunately, despite incidence of STEC O157 exceeding national objectives in Boulder County, the incidence of the infection-causing hemolytic uremic syndrome (HUS) has been low. STEC O157 is the most common cause of HUS; 6% of patients develop HUS within 2-14 days of onset of diarrhea.³ It primarily impacts children and can lead to kidney failure.

Salmonella & *Vibrio*

The incidence of both *Salmonella* and *Vibrio* has increased in Boulder County above the previous five-year median. A similar but not as drastic increase in incidence occurred throughout the state between 2015 and the previous five-year median for *Salmonella* diagnoses, but not for *Vibrio*. Nationwide in 2014, *Salmonella* disproportionately impacted children younger than 5 years of age, while *Vibrio* primarily impacted people over the age of 40.⁴

Food Safety HP2020 Objectives

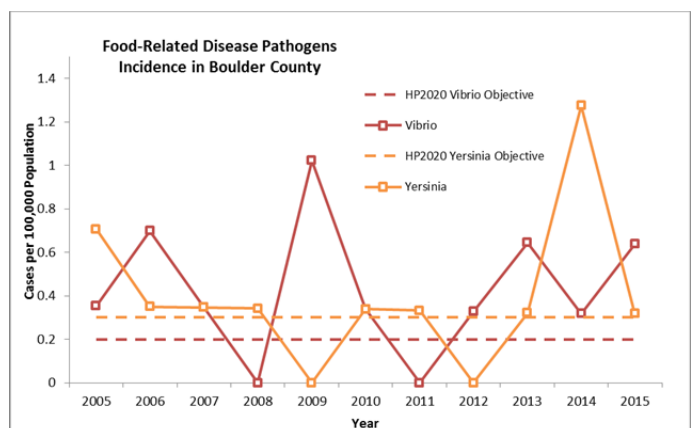
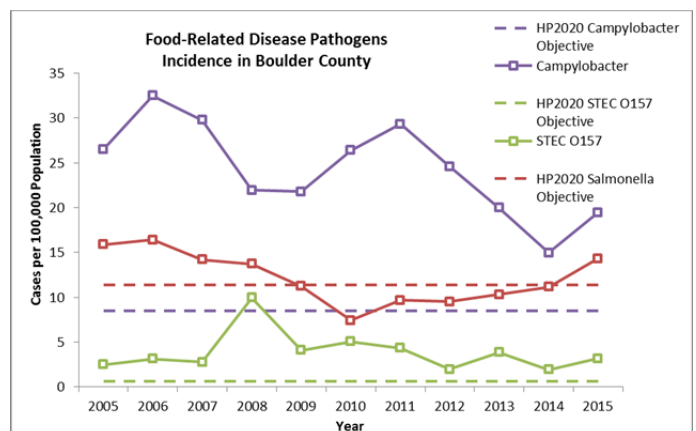
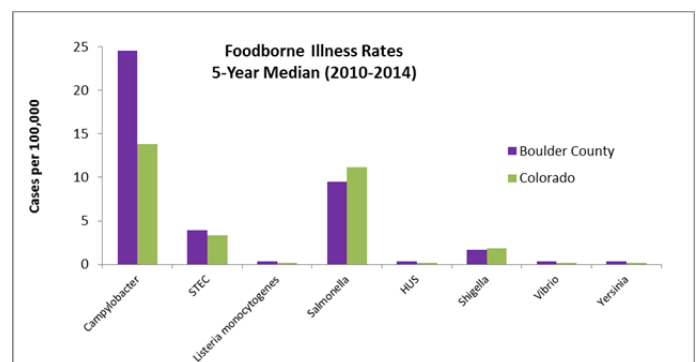
FS-1 – Reduce infections caused by key pathogens transmitted commonly through food.

FS-2 – Reduce the number of outbreak-associated infections due to Shiga toxin-producing *E. coli* O157, or *Campylobacter*, *Listeria*, or *Salmonella* species associated with food commodity groups (beef, dairy, fruits and nuts, leafy vegetables, poultry).

FS-4 – Reduce severe allergic reactions to food among adults with a food allergy diagnosis (baseline 29.3% in 2006, target 21%).

FS-5 – Increase the proportion of consumers who follow key food safety practices.

FS-6 – Increase the proportion of fast-food and full-service restaurants that follow food safety practices that prevent foodborne illness outbreaks.



Yersinia

The incidence of *Yersinia*, primarily acquired through consumption of raw or undercooked pork, has varied in Boulder County since 2005, with a large spike occurring in 2014 – a trend that was not mirrored across Colorado or the nation.

Shigella

Shigella has been primarily decreasing in the county since 2005, with 6 cases per 100,000 population reported in 2005 and 1 case per 100,000 in 2015.

Listeria

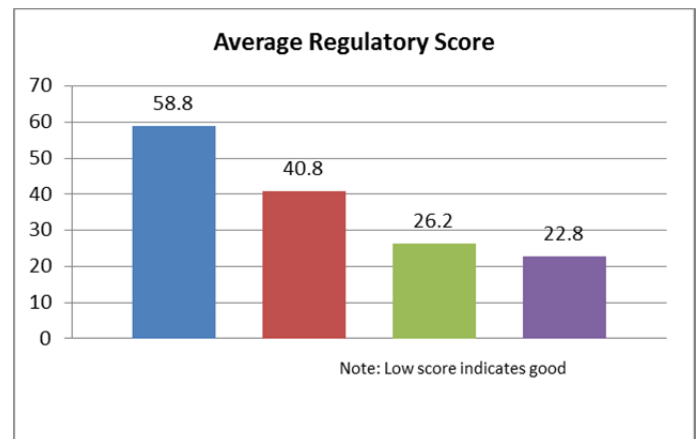
A foodborne pathogen that has an environmental reservoir is *Listeria monocytogenes*, which are typically found in water and soil. While the frequency of cases in Boulder County is low, the health implications are significant. Of the 116 confirmed cases of *Listeria monocytogenes* in the United States in 2014, 15% died, and 91% were hospitalized.⁴

Norovirus

While norovirus is often not lab-confirmed due to its short-lived symptoms, there are several outbreaks of the virus in Boulder County each year. From January to July 2016, 8 of 12 reported foodborne illness outbreaks in the county (72% of the 131 persons ill) were caused by norovirus.

Regulatory Inspections

In 2013, the BCPH Food Safety Program study identified cold holding, hygienic practices, soap and drying devices, proper cooling, proper handwashing, and hot holding as the top food safety risk factors. Since 2007, average regulatory scores have decreased (e.g. improved) significantly.⁵ As compliance with risk factor reduction measures has increased, outbreak investigations have decreased.



Home Food Safety

National objectives outline four key food safety practices: clean, separate, cook, chill. Data collected by the BCPH Food Safety Program in 2010 and 2012 indicated that Boulder County residents follow most key food safety practices at a rate far below national targets. In addition, concerns about increased foodborne illness due to home food preparation have increased with the passing of the Colorado Food Cottage Act in 2012 and further expansion in 2015, which allows for certain “non-potentially hazardous” foods that don’t require refrigeration to be prepared at home and sold for profit.⁶

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Creating a Community Where All People Can Eat Healthy and Be Active



Goal

Create a community where all Boulder County residents have the opportunity to eat healthier and live more actively, with a focus on increasing equity.

Strategies

Support policies to encourage healthy eating and active living

- Support healthy meeting and vending policy adoption
- Support healthy beverage policy adoption
- Support the Lafayette Youth Advisory Committee and City of Lafayette to adopt a healthy beverage ordinance
- Support policies that seek to increase low-cost transportation options
- Actively participate in regional work to promote sugary drink policies and develop a strategy for local and statewide policy

Support integration of HEAL strategies in planning and initiatives

- Work with Boulder County municipalities to incorporate HEAL goals objectives and strategies into their comprehensive and master plans.
- Work with law clinic and statewide partners to pilot WIC innovations for farmers markets.

Assess and evaluate initiatives

- Assess and evaluate use of Double Up Colorado to understand utilization and direct future outreach efforts.

Identify and seek funding and resources

- Seek funding and resources for new initiatives, like Health Impact Assessments

Outreach to and educate residents

- Link community to Double Up Colorado resources
- Work on regional marketing campaign to promote healthy beverage consumption.

Intermediate Outcomes

Increased healthy policy adoption.

Increased healthy food and beverage consumption and decreased unhealthy food and beverage consumption.

Increased physical activity.

Increased bike and pedestrian infrastructure.

More dollars invested in healthy community design.

Long-Term Outcomes

Healthy children and families: Lower risk and incidence of coronary heart disease, depression, type 2 diabetes, childhood obesity, adult obesity, associated cancers, stroke, and high blood pressure.

Healthy community design.

Creating a Community Where the Air in All Homes is Safe and Healthy



Goal

Improve indoor air quality related to radon, lead, mold, asbestos, VOCs, and methamphetamine use and production

Strategies

Promote and support regulation and policy

- Encourage radon mitigation systems in new single family and multi-family (particularly low-income) homes through building codes and at the point of sale
- Encourage the use of The American Association of Radon Scientists and Technologists National Radon Proficiency Program (AARST-NRPP) or National Radon Safety Board (NRSB) certified radon professionals for testing and mitigation
- Assist in enforcing Boulder County methamphetamine contamination ordinances

Outreach and provide education

- Promote radon testing and educate residents about proper installation of radon reduction systems
- Outreach to, and educate real estate professionals, schools, businesses, and residents (particularly low-income) to increase radon awareness in Boulder County. (social mobilization)
- Educate families about the need for lead testing, awareness, and safety
- Continue to educate local municipal building officials, elected officials, realtors, landlords, and property owners/managers about the health impacts associated with mold, radon, moisture, ventilation, asbestos, and methamphetamine contamination and how to address these issues.

Partner with health care providers

- Partner with local health clinics to educate patients with acute asthma issues to assess their homes for mold, asbestos, and VOCs

Intermediate Outcomes

Model policy and technical guidance documents for radon testing and mitigation written and shared

Increased awareness and support for radon testing and mitigation among real estate professionals

Increased awareness and support for radon testing and mitigation among general population

Radon Resistant New Construction (RRNC) building codes adopted

Reduced incidence of elevated lead blood levels

Reduced incidence of exposure to mold, radon, asbestos, and lead

Methamphetamine contaminated homes are adequately cleaned up

Long-Term Outcomes

Healthy living and working environments

Reduced incidence of asthma and cancer related to indoor air exposures

Creating a Community Where All Outdoor Air is Clean and Safe



Goal

Improve outdoor air quality

Strategies

Support, promote, and enforce policy

- Investigate and support enforcement of oil & gas and residential/commercial air pollution requirements.
- Support the adoption of continuously increasing renewable energy standards
- Support the adoption of continuously increasing auto fuel-efficiency standards
- Promote the use of sustainable and lower-emitting fuels and encourage the adoption of strategies that reduce vehicle miles traveled in state regulations and in state implementation plans
- Actively participate in the development of protective air quality policies and plans
- Encourage the adoption of local, state and federal regulations and policies that reduce the impacts of oil and gas resource extraction

Educate and mobilize action

- Educate, empower, and mobilize action to reduce ozone-forming and greenhouse gas (GHG) emissions
- Promote the use of locally sourced biofuels derived from local waste oil within the Boulder County
- Promote the use of sustainable and lower-emitting fuels

Monitor and investigate

- Identify and investigate oil & gas, transportation, and residential/commercial emission sources and monitor air quality conditions
- Enhance monitoring of harmful air pollutants from oil and gas operation sites

Intermediate Outcomes

The most stringent regulations and necessary staff oversight to control oil and gas production are in place

Oil and gas contributions to ozone formation and public health impacts is better understood

Auto fuel-efficiency standards are increased

Individual vehicle miles traveled are reduced

Use of alternative fuels is increased

Renewable energy use is increased

Emission sources are better understood

Long-Term Outcomes

Boulder Ozone Monitors achieve attainment with the 2008 (75ppb) ozone standard

Reduced heat-related illness, including cardio-pulmonary illness, food, water and vector-borne diseases, and negative impacts on mental health.

Creating a Community Where All People Have Access to Safe Water



Goal

Improve water quality, prevent waterborne illness, and reduce negative environmental and public health impacts to the watersheds of Boulder County

Strategies

Monitor and track quality and health impacts

- Monitor and track stormwater regulation compliance
- Investigate and track water quality contamination events
- Monitor the impact of oil and gas activities on water quality
- Monitor and track drinking water testing data
- Identify unregulated recreational areas
- Monitor and track recreational water testing data and disease incidence
- Implement SepticSmart onsite wastewater treatment system program

Enforce regulations

- Enforce stormwater regulation compliance
- Support state oversight of small public system operators
- Enforce pool and swim area regulations
- Enforce onsite wastewater treatment system regulations

Educate and encourage testing

- Educate about and encourage voluntary drinking water testing from small public systems and private wells
- Educate the public and partners about emerging water contaminants

Partner locally, regionally, and statewide

- Participate on steering committee for Keep it Clean Partnership (Stormwater)
- Participate in the development of watershed notification system
- Develop local Greywater programs in partnership with local entities
- Participate in resiliency planning for disasters and climate change
- Collaborate with system operators in source water protection and other watershed health efforts
- Promote beneficial reuse of treated water
- Collaborate with natural swim area managers

Intermediate Outcomes

Number of impaired stream segments is reduced

All small public drinking water systems are compliant

Swimming beach closures are less frequent

All OWTS systems are documented

Greywater ordinance is developed

Health and environmental justice issues are identified

Cross-county regional water initiative is created

Long-Term Outcomes

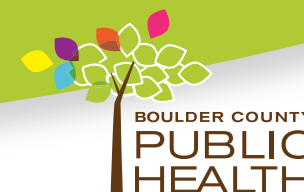
Reduced incidence of illness from waterborne disease

Reduced property loss from natural disasters

Reduced water use

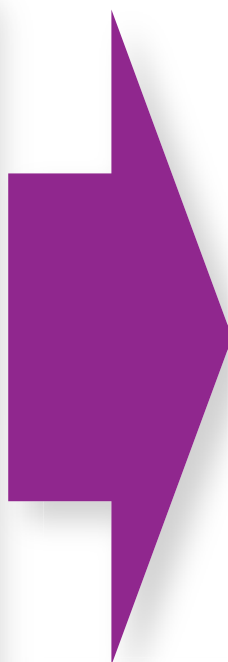
Equal access to clean, safe water

Creating a Community Where All People are Safe from Hazardous Waste



Goal

To reduce negative environmental and public health impacts from toxic substance and hazardous waste in Boulder County



Strategies

Collaborate and strengthen partnerships

- Build relationship with CDPHE and support their hazardous waste management and disposal initiatives
- Build relationships with hazardous waste disposal organizations
- Collaborate internally and with partners to prepare for, respond, and recover from hazardous waste and toxic substance emergencies
- Collaborate with the Land Use Department to ensure future development is not affected by hazardous waste sites

Outreach and educate

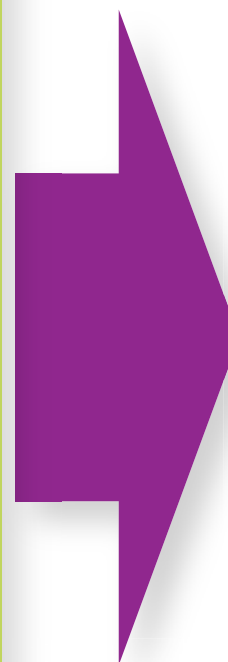
- Outreach to and educate the public about dangers of hazardous waste and toxic substances
- Promote the pharmaceutical take back program
- Provide information about health and environmental impacts for landfill sites and in response to illegal dumping

Identify, monitor, and respond to impacts to human or environment health

- Maintain the hazardous waste data and map
- Use data and technology to identify potential issues
- Monitor for and respond to community concerns that impact health equity and environmental justice
- Respond to hazardous waste/toxic substance emergencies
- Map radiation sources (natural and manmade)
- Map mine data

Promote policy

- Engage with state and federal partners on hazardous waste regulation
- Identify opportunities to develop local regulations



Intermediate Outcomes

Collaborative approach to hazardous waste response and disposal are enhanced

Toxic substances and hazardous wastes are identified, managed, and disposed of properly

Potential health equity and environmental justice issues are identified, tracked, and responded to



Long-Term Outcomes

Impact of hazardous waste and toxic substances on environmental and human health (e.g. cancer) is reduced



Creating a Community Where Food is Safe for All People



Goal

Serve as a trusted and innovative leader striving to protect the community through the prevention of foodborne illness

Strategies

Meet statutory requirements and FDA Voluntary Standards

- Fulfill CDPHE delegate contract requirements
- Meet and implement FDA Voluntary National Program Standards
- Conduct AMC (Active Managerial Control) assessments
- Participate in statewide process to revise food safety regulations

Maintain and expand partnerships

- Create new Partners for Food Safety program
- Continue to coordinate the Food Safety Advisory Committee

Respond to and investigate food borne illness complaints

- Respond to food borne illness complaints and conduct foodborne illness investigations
- Respond to food-related complaints about manufacturing, cottage, home, agriculture, institutions, or travel

Develop and conduct training, education, and outreach

- Develop & conduct food safety training, including using oral culture techniques
- Outreach and educate about manufacturing, cottage, home, agriculture, institution, and travel-related food safety
- Continue to partner with CDPHE to provide training online

Promote regulation revisions and new policy

- Promote policy to enhance food safety related to manufacturing, cottage, home, agriculture, institution, and travel-related food safety
- Participate in statewide process to revise food safety regulations

Intermediate Outcomes

Adequate program staffing achieved by meeting FDA goals

Health data used to reduce disparities within the community

Increased number of retail food facilities are Partners for Food Safety

Increase in number of food handlers adequately trained in food safety

Reduced food borne illness risk factors

Long-Term Outcomes

Reduced incidence of foodborne disease

All retail food facilities are Partners for Food Safety

Creating a Community Free of Illness from Environmental Diseases



Goal

Prevent the transmission of disease from vectors to humans in Boulder County

Prevent the spread of diseases acquired through body art procedures.

Strategies

Enhance surveillance and respond to, and investigate disease exposures

- Improve West Nile Virus surveillance in unincorporated Boulder County.
- Expand and strengthen GIS mapping capabilities.
- Investigate all potential rabies, plague, and tularemia exposures.
- Respond to mosquito and bed bug complaints

Provide education and outreach

- Outreach to the public, animal control, and veterinarians about current trends, best practices, and policy changes.
- Encourage integrated pest management among homeowners.
- Outreach to the school districts and CU about body art safety.

Strengthen partnerships

- Enhance collaboration with other Boulder County agencies, municipalities, and schools.

Improve health care

- Support a state registry for rabies vaccinations.
- Support policy development to require pet vaccination.

Control mosquito populations

- Implement county-wide mosquito control program.
- Manage habitat related to flood irrigation.

Conduct inspections

- Conduct regular assessments and inspections of body art facilities.

Intermediate Outcomes

Improved pet vaccination rates.

Rapidly identified and investigated plague and tularemia cases.

Improved community awareness of mosquito district and pest management practices.

Reduced number of positive samples.

Improved sanitation in body art facilities.

Long-Term Outcomes

No human or animal deaths from vector borne diseases.

A community aware of the risks and precautions to take for safe body art.

Improved safety in body art facilities.

Creating a Business Community of Energy Efficiency and Conservation



Goal

Promote and improve public and environmental health in Boulder County by serving as a resource for energy efficient, greenhouse gas-reducing measures; encouraging conservation; decreasing contamination of water; and reducing exposure to pollutants and toxins

Strategies

Advise on, support, and recognize business sustainability actions

- Offer rebates, incentives and advising to businesses to reduce greenhouse gas emissions, reduce waste generation, increase waste diversion, reduce water use, and improve water quality
- Certify and recognize businesses that reduce greenhouse gas emissions, reduce waste generation and increase waste diversion, and reduce water use

Support and promote sustainability policies and practices

- Support development of policies that encourage reducing greenhouse gas emissions
- Promote commercial strategy adoption, infrastructure, job creation to local use and source recycled or compostable feedstocks
- Promote policies and practices that enable vehicles to be fueled by solar power and use vehicle battery storage for grid stabilization
- Promote commercial transportation demand reduction policies and sustainable commuting practices
- Promote local, state, and national policies to encourage water efficiency

Build partnerships

- Build partnerships with local businesses, municipalities, and non-profit organizations

Advise and support businesses in adapting to climate change

- Assist businesses to implement severe weather adaptaton and response plans

Intermediate Outcomes

Businesses are more energy efficient and mindful of conservation

Certified businesses change the norms of Boulder County business culture to be more sustainably focused

Municipal and federal government regulations are created and promoted to reduce greenhouse gas emissions

Long-Term Outcomes

Reduced business contributions to countywide greenhouse gas emissions by 40% below 2005 levels by 2020.

Reduced incidence of climate change caused ailments such as respiratory illness, heat stroke, dehydration, vector borne diseases, and natural disaster-caused property loss

Theme	Sub-Theme	Factors	Magnitude	Severity	Equity	Actionability	Factor Score	Strategies	Effectiveness and Reach	Expected Impact	Community Readiness	Agency Readiness	Mandated	Strategy Score
	Theme 1	Factor 1.1						Strategy 1.1.1						
								Strategy 1.1.2						
		Factor 1.2						Strategy 1.2.1						
								Strategy 1.2.2						
								Strategy 1.2.3						
		Factor 1.3						Strategy 1.3.1						
	Theme 2	Factor 2.1						Strategy 2.1.1						
								Strategy 2.1.2						
		Factor 2.2						Strategy 2.2.1						
								Strategy 2.2.2						
								Strategy 2.2.3						
		Factor 2.3						Strategy 2.3.1						